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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,554	11/24/2003	Tetsuya Satou	OGO:089A	1824
6160	7590	02/16/2005	EXAMINER	
PARKHURST & WENDEL, L.L.P. 1421 PRINCE STREET SUITE 210 ALEXANDRIA, VA 22314-2805			YAMNITZKY, MARIE ROSE	
			ART UNIT	PAPER NUMBER
			1774	

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/718,554

Applicant(s)

SATOU ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 19-43 and 45-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-43 and 45-50 is/are allowed.
- 6) ☒ Claim(s) 19-21 and 51-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's amendments filed on December 07, 2004 and January 18, 2005 have been entered.

The amendment filed December 07, 2004 amends claims 19-21 and 43.

The amendment filed January 18, 2005 further amends claims 19-21, and cancels claim 44. The examiner notes that in the amendment filed January 18, 2005, the correct status identifier for claim 43 is --Previously Presented-- instead of "Previously Amended".

Claims 19-43 and 45-53 are pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. The rejection of claim 19 under 35 U.S.C. 112, first paragraph, as set forth in the Office action mailed September 16, 2004 is overcome by applicant's amendment.

The rejection of claim 43 under 35 U.S.C. 103(a) as unpatentable over Nakaya et al. (US 5,792,557) in view of VanSlyke et al. (US 4,720,432) is overcome by applicant's amendment.

The rejection of claim 44 under 35 U.S.C. 103(a) as unpatentable over Nakaya et al. (US '557) in view of VanSlyke et al. (US '432) is rendered moot by claim cancellation.

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4. Claims 22-43 and 45-50 are allowed.

5. Claims 19-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Support for Ar3 as defined in present claims 19-21 is not clear because the scope of Ar3 as defined in these claims is not clear (see the following rejection under 35 U.S.C. 112, second paragraph).

Presuming “one phenyl ring” refers to the divalent phenylene ring of the substituted or unsubstituted phenylene group (instead of a monovalent group as indicated by -yl of “phenyl”), the original specification inherently provides support for Ar3 as an unsubstituted phenylene group, but does not clearly provide support for Ar3 as a substituted phenylene group meeting the claim limitations. The only substituents for Ar3 that are explicitly taught in the original specification are alkyl and alkoxy groups. Substitution of a phenylene group with alkyl and/or alkoxy groups would provide a phenylene group having more than six carbon atoms and therefore outside the scope of the present claims.

If “one phenyl ring” refers to a monovalent group substituted on the divalent phenylene ring, the original specification does not provide explicit support for the claim limitations because a phenyl ring or group is not explicitly disclosed as a substituent for the phenylene group of Ar3,

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and it would not be possible to have a phenyl-substituted phenylene group that has only six carbon atoms.

6. Claims 19-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of Ar3 as defined in claims 19-21 is not clear.

It is not clear if “one phenyl ring” refers to the divalent phenylene ring of the substituted or unsubstituted phenylene group, or to a monovalent group substituted on the divalent phenylene ring.

It is not clear if the “number of carbon atoms...being six” refers to the number of carbon atoms in the phenylene group exclusive of substituents, or if any substituent for a substituted phenylene group represented by Ar3 must be free of carbon atoms.

7. Claims 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawamura et al. (US 6,541,129 B1).

Kawamura et al. disclose compounds for use in the hole transporting zone of an organic EL device. As taught at column 3, lines 35-42, a light emitting layer may be the hole transporting zone in some cases. As taught in the paragraph beginning at c. 107, l. 56, compounds represented by general formula (III) comprising an aryl group having a styryl group have a high fluorescent property and can be used as a light emitting material. General formula

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(III) is shown in column 4. The compound of formula PD-56 as shown in c. 37-38 (also shown in c. 107-108 as PD-56') is a compound of general formula (III) comprising an aryl group having a styryl group.

The compound of formula PD-56/PD-56' is a compound of formula (1) as defined in present claims 19 and 20 in which each of Ar1 and Ar2 represents an unsubstituted aryl group (specifically, a phenyl group), Ar3 represents an unsubstituted p-phenylene group (one phenyl(ene) ring; the number of carbon atoms in the group is six), X represents a substituent containing two carbon rings and non-planarly bonding to a diphenylamine portion (specifically, a group of formula (2) as shown on page 17 of the present specification in which each of R1 and R2 represents a hydrogen atom), and Y represents a substituted aryl group (specifically, a substituted phenyl group) substituted with an electron-donating substituent. The substituted aryl group in the prior art compound which corresponds to Y of present general formula (1) has a portion in which there are more than five conjugated bonds.

The present application claims foreign priority of two Japanese applications, one of which was filed prior to the 102(e) date of the '129 patent to Kawamura et al. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al. (US 6,541,129 B1) as applied to claims 19 and 20 above, and for the further reasons set forth below.

The compound of formula PD-56/PD-56' differs from a compound of formula (1) as defined in present claim 21 in that the phenylene group of the prior art compound corresponding to present Ar<sub>3</sub> is a p-phenylene group rather than an m-phenylene group. Thus, the prior art compound is a position isomer of the compound required by claim 21.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds similar in structure to the compounds disclosed by Kawamura et al. with the expectation that compounds that are similar in structure will have similar properties and can be used for the same purpose as the specific compounds disclosed by Kawamura et al. Compounds which are position isomers are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. One of ordinary skill in the art would have reasonably expected that a compound similar to PD-56, but having the diphenylamino group which corresponds to present (Ar<sub>1</sub>)(Ar<sub>2</sub>)N- shifted one carbon position clockwise or counterclockwise on the phenylene group corresponding to present Ar<sub>3</sub>, would have hole transporting and fluorescent/light emitting properties similar to PD-56.

9. Claims 19-21 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya et al. (US 5,792,557) in view of VanSlyke et al. (US 4,720,432).

Nakaya et al. disclose compounds meeting the limitations of a compound represented by formula (1) as defined in present claims 19-21 except for the requirement that Ar<sub>3</sub> represent a phenylene group (a p-phenylene group in the case of claim 20 or an m-phenylene group in the

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case of claim 21) and the requirement that the aryl group represented by Y be substituted with an electron-donating substituent. For example, see the compounds represented by formulae VIII-23, VIII-34, VIII-38 through VIII-44, XI-5 through XI-9 and XI-39 through XI-43. These compounds correspond to compounds of formula (1) as set forth in claims 19-21 wherein Ar<sup>3</sup> represents a biphenylene group, and there is no electron-donating substituent on the group represented by Y.

With respect to the requirement in claims 19-21 that X represent a substituent containing two or more carbon rings and non-planarly bonding to a diphenylamine portion, the present specification teaches that the use of a bulky substituent as X results in non-planar bonding. The present specification provides several examples of substituents that meet the limitations of X as defined in claims 19-21, such as the substituents represented by general formula (2) on page 17 of the specification, but the claims are not limited to those examples. It is the examiner's position that, absent evidence to the contrary, it is reasonable to expect that the substituents corresponding to present variable X in the specific prior art compounds referenced above are sufficiently bulky to provide non-planar bonding. For example, Nakaya's compounds represented by formulae VIII-44 and XI-43 have an aryl group having seven fused carbon rings at the position corresponding to present variable X. This aryl group is bulkier than the substituent represented by general formula (2) on page 17 of the present specification.

Nakaya et al. disclose a compound meeting the limitations of a compound represented by formula (15) as defined in present claim 51, with claims 52 and 53 dependent therefrom, except



that Nakaya's compound has a biphenylene group rather than a phenylene group linking the two nitrogens. See the compound represented by formula XI-5.

Nakaya's compounds have hole injecting and transporting properties and may be used in the luminescent layer of an organic EL device. Nakaya's compounds have two diarylamine substituents joined by a biphenylene group whereas the compounds of present claims 19-21, 43, 44 and 51-53 have two diarylamine substituents joined by a phenylene group.

VanSlyke et al. disclose organic EL devices and teach that compounds having hole transporting capabilities can be provided by compounds having two diarylamine substituents joined by an arylene group such as a phenylene moiety having 1-4 phenylene rings. For example, see column 8, lines 39-68.

One of ordinary skill in the art at the time of the invention would have been motivated to make compounds similar to the compounds disclosed by Nakaya et al. with the expectation that compounds similar in structure would have similar properties and could be used for the same purpose as Nakaya's compounds. One of ordinary skill in the art at the time of the invention, having knowledge of the teachings of VanSlyke et al., would have reasonably expected that compounds similar to those disclosed by Nakaya et al. having a phenylene group joining two amino groups instead of a biphenylene group would have properties similar to the properties of Nakaya's compounds.

Further with respect to the compound required by present claims 19-21, while the specific prior art compounds referenced above do not have an electron-donating substituent directly bonded to any of the biphenyl or fused aromatic groups, compounds having further amine

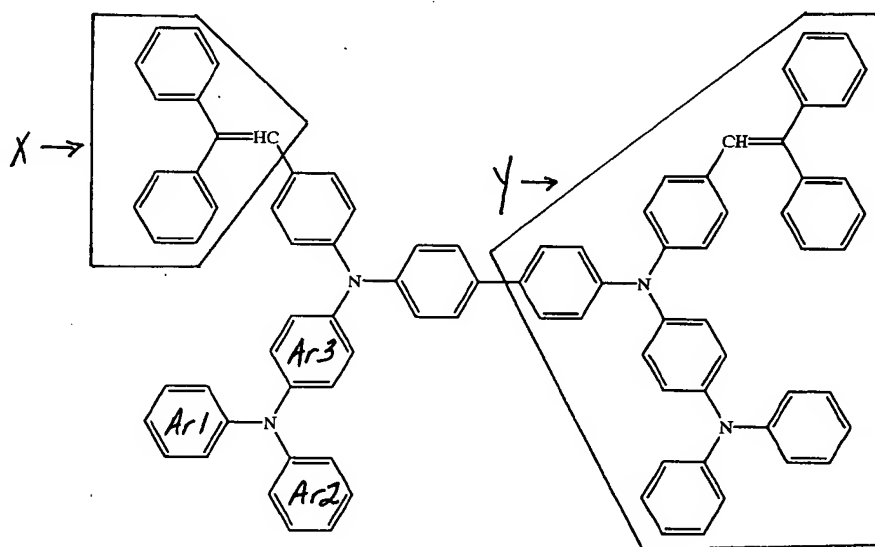
substituents are disclosed in the prior art. For example, see the compounds represented by formula XI-10 through XI-16. Amine substituents are electron-donating substituents. One of ordinary skill in the art would have reasonably expected that compounds similar to the compounds represented by formulae XI-5 through XI-9 or XI-39 through XI-43, for example, but having a substituent such as an amine substituent on each of the biphenyl or fused aromatic groups would be suitable for the prior art purposes since compounds containing additional amine substituents are disclosed in the prior art.

Nakaya's compound of formula XI-5 further differs from the compound required by present claim 53 in that it lacks the four methoxy substituents required by the compound of claim 53. However, given Nakaya's teachings as a whole, one of ordinary skill in the art at the time of the invention would have reasonably expected that compounds similar to Nakaya's compound of formula XI-5 having methoxy substituents at various positions on the phenyl rings would have properties similar to the compound of formula XI-5 and could be used for the same purpose. In particular, see column 13, lines 1-48.

10. Applicant's arguments filed December 07, 2004 and January 18, 2005 have been fully considered but they are not persuasive with respect to the patentability of claims 19-21 and 51-53.

With respect to the rejection of claim 19 as anticipated by Kawamura et al. (US '129), applicant argues that the group characterized by the examiner as a phenylene group is actually a biphenylene group and therefore the reference does not anticipate the claims. The examiner

respectfully disagrees. Kawamura's formula PD-56/PD-56' is reproduced below with notations added by the examiner to show how the formula corresponds to present general formula (1).



The examiner has also applied the Kawamura patent against claims 20 and 21 in this Office action. The examiner had previously interpreted the requirement for five or more conjugated bonds with respect to variable Y of general formula (1) as requiring that the aryl group, absent any substituent, must have five or more conjugated bonds. With this narrow interpretation, Kawamura's compound of formula PD-56/PD-56' does not have a portion corresponding to Y, and Kawamura's disclosure would not anticipate present claims 19 or 20, or suggest present claim 21. However, the claim language defining Y can be more broadly interpreted to encompass compounds in which the substituted aryl group, as a whole, contains five or more conjugated bonds. With this broader interpretation, PD-56/PD-56' contains a portion meeting the limitations of Y as defined in claims 19-21 because the diphenylvinylphenyl

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group which is part of the electron-donating substituent of the substituted aryl group corresponding to Y has more than five conjugated bonds.

With respect to the rejection based on Nakaya et al. in view of VanSlyke et al., applicant argues that a phenylene group in place of a biphenylene group leads to high electroluminescent efficiency due to lack of rotation, and that there is no reasonable expectation of similar properties between the two types of compounds. Applicant's arguments are not persuasive because applicant has not provided any objective evidence commensurate in scope with the rejected claims to demonstrate that the compounds required by the rejected claims provide superior/unexpected properties compared to Nakaya's similar compounds. The examiner notes that the present specification provides no data comparing compounds having a phenylene group as Ar<sub>3</sub> to compounds having a biphenylene group as Ar<sub>3</sub>. The paragraph bridging pages 40 and 41 teaches that a phenylene group is "particularly suitable" for Ar<sub>3</sub>, but also discloses a biphenylene group as suitable. Based on the teachings of VanSlyke et al., one of ordinary skill in the art at the time of the invention would have reasonably expected that compounds similar to Nakaya's compounds having a phenylene group, instead of a biphenylene group, joining two amino groups would have properties similar to the properties of Nakaya's compounds.

Applicant also argues that neither the Nakaya patent nor the VanSlyke patent contains any teachings regarding the need for a substituent that contains two or more carbon rings and non-planarly bonds to a diphenylamine portion as required for present variable X. The rejection has been modified to specifically address this limitation.

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Further with respect to claims 51-53, applicant argues that the advantages of the terphenyl groups required by these claims are not recognized by the prior art. This argument is not persuasive because the prior art compound represented by formula XI-5 contains terphenyl groups as required by claims 51-53 (although lacking the methoxy substituents required by claim 53). The only difference between the compound required by claims 51 and 52, and the prior art compound of formula XI-5, is the presence of a biphenylene group where the present compound requires a phenylene group. The examiner's position regarding this difference is of record.

11. Miscellaneous:

The requirement for substitution with an electron-donating substituent is set forth twice within the last three lines of claim 21.

12. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for Art Unit 1774 is (703) 872-9306 for all official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
February 14, 2005



MARIE YAMNITZKY  
PRIMARY EXAMINER

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